PILOT STUDY ON THE PREVALENCE OF SALMONELLA IN SLAUGHTER PIGS IN GERMANY: IV. FIELD EXPERIENCES USING THE DANISH SEROLOGICAL METHOD FOR DETECTION

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In an interlaboratory study on the prevalence of *Salmonellae* in German slaughter pigs a comparison of the traditional bacteriological and the serological technique used in the Danish *Salmonella* control programme was included. In total, about 12000 animals were investigated using both techniques. Samples were collected from February through June 1996. Seven slaughterhouses distributed over the whole country participated on a voluntary basis. A total of 11,942 animals delivered in 752 lots at ten occasions to the participating slaughterhouses were investigated. The lots often comprised pigs from individual finishing farms. From each lot, a maximum of 50 animals were sampled. A faecal swab, a mesenteric lymph node and a meat sample were collected from each carcass. The results of the microbiological analysis of faeces and lymph nodes of each animal were described in separate presentations.

METHOD

For the serological assay a meat sample was taken from the diaphragm pillar. The meat sample used in the serological assay was frozen at -20°C. Following thawing, meat juice was collected and tested in an indirect ELISA using mixed purified LPS from *S. Choleraesuis* and *S. Typhimurium* as antigens. The cut off level used was identical to that used in the Danish *Salmonella* control programme *(Nielsen et al., 1995)*.

This serological test was used for the detection of specific antibodies caused by the infection. As fecal excretion of *Salmonella* bacteria typically decreases within a few weeks, bacteriological methods have a low sensitivity in chronically infected pigs. In contrast, this serological method enables to detect herds with a history of *Salmonella* infection.

RESULTS

Serological findings with 7.7% positives gave a similar figure compared to 6.2% animal prevalence rate found by the bacteriological investigation (Table 1).

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Table 1. Percentage of *Salmonella* positive samples from swine (n = 11 092)

Sample	% positive
Faecal swab	3.7
Lymph node	3.3
Lymph node or faecal sample	6.2
ELISA of meat juice	7.7

34% of the animals carrying *Salmonella* in the lymphnode and 49.5% with a positive bacteriological result in the fecal swab and the lymph gland showed a positive serological reaction. In contrast, only 6% of the animals with a negative bacteriological result gave a positive serological reaction (Table 2).

Table 2. Comparison of bacteriological and serological results

	Bacteriological negative		Bacteriological positive	
Specimen	Investigated	% serological positive	Investigated	% serological positive
Faecal samples	11419	6,7 %	445	31,9 %
Lymph node	11474	6,8 %	390	34,4 %
Faecal swab and lymph node	11773	7,4 %	91	49,5 %
Only Surface sample	11377	7,8 %	487	5,7 %

Compared to the bacteriological findings, the estimated lot prevalence rate was somewhat higher. In 66% of all lots, no positive reactor was detected, in 5% the prevalence rate was very high (over 50% of all animals investigated). Based on the upper confidence limit this percentage may be even higher (Table 3).

Table 3. *Salmonella* prevalence in the lots of finishing swine by serological examination

Prevalence group (x= %positives)	Estimate prevalence rate (No. Pos / No. Investigated)	
	No.	%
Negative	408	66.0
x <= 10%	80	12.9
10%<x <= 20%	44	7.1
20% < x < 50%	55	8.9
x >= 50%	31	5.0

CONCLUSIONS

This pilot study gave an overview on the *Salmonella* situation in German slaughter pigs. The overall prevalence rates detected are comparable to those reported in finishing swine from other Member States. About 5% of the lots yielded a high contamination rate.

The serological method proved to be a suitable technique to be used in the context of a continuous monitoring programme. The main advantages are the low price of the investigation and the easy access and handling of the samples. Furthermore, this method enables to detect herds with a history of *Salmonella* infection. This will be very helpful within the schedule of a control programme.

Based on these results, all parties involved (governmental, scientific and industrial organisations) are working at a surveillance and control program which should be set up in Germany.

The meat juice ELISA will be used as a method for identifying and classifying the *Salmonella* status of fattening units in Germany. Participation of production units in the scheme is to be voluntary. The result of the investigation - 70% of the lots serologically negative - should be an incentive for the majority of producers participating in the self-control scheme to increase their efforts to maintain or to improve the registered *Salmonella* status. Veterinary health services and appropriate organisations will assist in these endeavours.

Practical investigations and documentation of results in data banks for several Länder will be carried out from only a few centres in the Federal Republic. The establishment of the system is considered to be feasible within a period of 18 to 24 months.

Two different working groups, under the direction of the Ministries for Agriculture and Health, are concerned with the implementation of the results, working on strategies aimed at minimizing the importation of *Salmonella* into pig production units. A system of self-control is envisaged, beginning in the meat production industry, accompanied by state veterinary supervision.

REFERENCES

Nielsen, B., Baggesen, D., Bager, F., Haugegaard, J. Lind P., 1995. The serological response to *Salmonella* serovars typhimurium and infantis in experimentally infected pigs. The time course followed with an indirect anti-LPS ELISA and bacteriological examinations. Vet. Microbiol. 47: 205-218.